# Different outcome definitions

## Ischemic stroke

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 433434435437 | Occlusion and stenosis of basilar artery with/without cerebral infarctionOcclusion of cerebral arteriesTransient cerebral ischemiaOther generalized ischemic cerebrovascular disease |
| **Abraham 2015** | (ICD9) | 433.x1434.x1436 | Occlusion and stenosis of basilar artery with/without cerebral infarction or occlusion and stenosis of carotid artery with cerebral infarctionCerebral thrombosis with cerebral infarction or cerebral embolism with cerebral infarctionAcute but ill-defined cerebrovascular disease |
| **Coleman 2016** | (ICD10) | I63 (433) | Cerebral infarction |
| **Bouillon 2015** | (ICD10) | I63 (433) | Cerebral infarction |
| **Maura 2015** | (ICD10) | I63 (433) | Cerebral infarction except code i63.6 (cerebral infarction due to cerebral venous thrombosis, no pyogenic) |
| **Larsen 2016** | (ICD10) | I63I64 | Cerebral infarction Embolism of unspecified occlusion in different areas |
| **Yao 2016** | (ICD9) | 433.x1434.x1436 | Occlusion and stenosis of basilar artery with/without cerebral infarctionOcclusion and stenosis of carotid artery with cerebral infarction cerebral thrombosis with cerebral infarctionCerebral embolism with cerebral infarction acute but ill-defined cerebrovascular disease |
| **Staerk 2016** | (ICD10) | Not reported | Cerebral infarction |
| **Francis 2015** | (ICD9) | 433.x1434.x1436 | Occlusion and stenosis of precerebral arteriesOcclusion of cerebral arteriesAcute but ill-defined cerebrovascular disease |
| **Tsadok 2016** | (ICD10) | G45.0 (435.x)G45.1 (435.8)G45.2G45.3G45.8 (435.x)G45.9 (435.9)H34.1 (362.31)I63 (435)I64 (436) | Vertebrobasilar artery syndromeCarotid artery syndrome (hemispheric)Multiple and bilateral precerebral artery syndromesAmaurosis fugaxOther transient cerebral ischaemic attacks and related syndromesTransient cerebral ischaemic attack, unspecified (Spasm of cerebral artery, Transient cerebral ischaemia NOS) Central retinal artery occlusionCerebral infarctionStroke, not specified as haemorrhage or infarction |
| **Lauffenburger 2015** | (ICD9) | 433.01/11/21/31/81/91434.0/01/1/10/11/9/90/91436 | Occlusion and stenosis of basilar artery with/without cerebral infarctionOcclusion and stenosis of carotid artery with cerebral infarction cerebral thrombosis with cerebral infarctionCerebral embolism with cerebral infarction acute but ill-defined cerebrovascular disease |
| **Alonso 2014** | (ICD9) | 433434435436437438 | Occlusion and stenosis of basilar artery with/without cerebral infarctionOcclusion of cerebral arteriesTransient cerebral ischemiaAcute, but ill-defined, cerebrovascular diseaseOther generalized ischemic cerebrovascular diseaseLate effects of cerebrovascular disease |
| **Larsen 2014**  | (ICD10) | I63 (433)I64.9 | Cerebral infarction?? |
| **Graham 2014** | (ICD9) | 433.01/11/21/31/81/91434.0/01/1/11/9/91436 | Occlusion and stenosis of precerebral arteriesOcclusion of cerebral arteriesAcute but ill-defined cerebrovascular disease |
| **Larsen 2014** | (ICD10) | I63 (433)I64.9 | Cerebral infarction?? |
| **Pallisgaard 2015** | (ICD10) | I63(433.xx)I64DG458DG459 | Cerebral infarction due to trhombosisStroke, not specified as haemorrhage or infarction????  |
| **Larsen 2013** | (ICD10) | I63 (433)I64.9 | Cerebral infarction?? |
| **Seeger 2015** | (ICD9) | 431.x 433.x1434.x1436.x 435.xx  | Intracerebral hemorrhage (ICH)Occlusion and stenosis of precerebral arteries with cerebral infarctionOcclusion and stenosis of cerebral arteries with cerebral infarctionAcute, but illdefined cerebrovascular eventsTransient cerebral ischemia |
| **Chan 2016** | (ICD9) | 433434436 852 853 | Occlusion and stenosis of basilar artery with/without cerebral infarctionOcclusion of cerebral arteriesAcute, but illdefined, cerebrovascular diseaseSubarachnoid subdural and extradural hemorrhage following injuryOther and unspecified intracranial hemorrhage following injury |
| **Villines 2015** | (ICD9) | 433.xx434.xx436.0 | Occlusion and stenosis of precerebral arteries with cerebral infarctionOcclusion of cerebral arteriesAcute, but illdefined, cerebrovascular disease |
| **Tsadok 2015** | (ICD9)(ICD10) | 362.3434435436G45.0G45.1G45.2G45.3G45.8G45.9H34.1I63I64 | Retinal vascular occlusionOcclusion of cerebral arteriesTransient cerebral ischemiaAcute, but illdefined, cerebrovascular diseaseVertebrobasilar artery syndromeCarotid artery syndrome (hemispheric)Multiple and bilateral precerebral artery syndromesAmaurosis fugaxOther transient cerebral ischaemic attacks and related syndromesTransient cerebral ischaemic attack, unspecified Central retinal artery occlusionCerebral infarctionStroke, not specified as haemorrhage or infarction |
| **Pallisgaard 2016** | (ICD10) | I60 I61I62I63 I64 | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic extradural haemorrhageCerebral infarctionStroke, not specified as haemorrhage or infarction |
| **Sorenson2013** | (ICD10) | I63(433x)I64 G458(435x)G459(435x)I74(444xx) | Cerebral infarctionStroke, not specified as haemorrhage or infarctionOther transient cerebral ischaemic attacks and related syndromesTransient cerebral ischaemic attack, unspecifiedArterial embolism and thrombosis |

## Haemorrhagic stroke

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 430431432852853854438 | Subarachnoid hemorrhage with 438.xx during hospitalizationIntracerebral hemorrhage with 438.xx during hospitalizationOther unspecified intracranial hemorrhage with 438.xx during hospitalizationSubarachnoid, subdural, and extradural hemorrhage following injury with Other unspecified intracranial hemorrhage following injury with 438.xx during hospitalizationIntracranial injury of other and unspecified nature with 438.xx during hospitalizationLate effects of cerebrovascular disease |
| **Yao 2016** | (ICD9) | 430431 | Subarachnoid hemorrhage with 438.xx during hospitalizationIntracerebral hemorrhage with 438.xx during hospitalization |
| **Lauffenburger 2015** | (ICD9) | 430431432 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhage |
| **Seeger 2015** | (ICD9) | 431.x | Intracerebral hemorrhage |
| **Villines 2015** | (ICD9) | 430431 | Subarachnoid hemorrhage Intracerebral hemorrhage  |

## Systemic embolism

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 444 | Arterial embolism and thrombosis  |
| **Bouillon 2015** | (ICD10) | I74 (444) | Arterial embolism and thrombosis  |
| **Maura 2015** | (ICD10) | I74 (444) | Arterial embolism and thrombosis  |
| **Larsen 2016**  | (ICD10) | I74 | Arterial embolism and thrombosis  |
| **Yao 2016** | (ICD9) | 444 | Arterial embolism and thrombosis  |
| **Larsen 2013** | (ICD10) | I74(444xx) | Arterial embolism and thrombosis |
| **Seeger 2015** | (ICD9) | 444.x | Arterial embolism |

## VTE

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 451.1x451.2x 453.xx 415.1xx | Phlebitis and thrombophlebitis of deep vessels of lower extremitiesPhlebitis and thrombophlebitis of lower extremities, unspecifiedOther venous embolism and thrombosisPulmonary embolism and infarction |
| **GorstRasmussen 2016** | (ICD10) | I26I80.1/2/9I81.9I63.6I67.6I82.2/3/8/9 | Pulmonary embolismPhlebitis and thrombophlebitis (limited)Embolism and thrombosis of unspecified veinCerebral infarction due to cerebral venous thrombosis, nonpyogenicNonpyogenic thrombosis of intracranial venous systemEmbolism and thrombosis (limited) |
| **Lauffenburger 2015** | (ICD9) | 415451453 | Acute pulmonary heart diseasePhlebitis and thrombophlebitisOther venous embolism and thrombosis |
| **Seeger2015** | (ICD9) | 451.1x/2x/81/91453.1x/2x/8x/9x/40/41/42/0 | Phlebitis and thrombophlebitis (limited)Other venous embolism and thrombosis (limited) |
| **Villines 2015** | (ICD9) | 451.1x453.xx 415.xx | Phlebitis and thrombophlebitis of deep vessels of lower extremitiesOther venous embolism and thrombosisAcute pulmonary heart disease |
| **LaLiberte 2014** | (ICD9) | 451.1x451.2x 453.xx 415.1xx | Phlebitis and thrombophlebitis of deep vessels of lower extremitiesPhlebitis and thrombophlebitis of lower extremities, unspecifiedOther venous embolism and thrombosisPulmonary embolism and infarction |
| **GorstRasmussen 2016** | (ICD10) | I26I80.1/2/9I81.9I63.6I67.6I82.2/3/8/9 | Pulmonary embolismPhlebitis and thrombophlebitis (limited)Embolism and thrombosis of unspecified veinCerebral infarction due to cerebral venous thrombosis, nonpyogenicNonpyogenic thrombosis of intracranial venous systemEmbolism and thrombosis (limited) |

## MI

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **Coleman 2016** | (ICD10) | I21 (410)I22 | Acute myocardial infarction Subsequent myocardial infarction  |
| **Bouillon 2015** | (ICD10) | I21 (410)I25 (414) | Acute myocardial infarctionChronic ischemic heart disease |
| **GorstRasmussen 2016** | (ICD10) | I21I22I23 | Acute myocardial infarction Subsequent myocardial infarctionCertain current complications following acute myocardial infarction |
| **Bengston 2016**  | (ICD9CM) | 410 | Acute myocardial infarction (excluding 410.x2, used to indicate follow-up of the initial episode) in the ﬁrst or second position |
| **Lauffenburger 2015**  | (ICD9) | 410.x1 | Acute myocardial infarction of anterolateral wall, initial episode of care |
| **Graham 2014** | (ICD9) | 410 (not all) | Acute myocardial infarction (limited) |
| **Larsen 2014** | (ICD10) | I21I22I23 | Acute myocardial infarction Subsequent myocardial infarctionCertain current complications following acute myocardial infarction |
| **Larsen 2013** | (ICD10) | I21(410xx)I22I23(429xx) | Acute myocardial infarctionSubsequent myocardial infarctionCertain current complications following acute myocardial infarction |
| **Seeger 2015** | (ICD9) | 410.X  | Acute myocardial infarction |
| **Chan 2016** | (ICD9) | 410 411412 | Acute myocardial infarctionOther acute and subacute forms of ischemic heart diseaseOld myocardial infarction |
| **Villines 2015** | (ICD9) | 410.xx | Acute myocardial infarction  |
| **Tsadok 2015** | (ICD9)(ICD10) | 410I21I22 | Acute myocardial infarctionAcute myocardial infarctionSubsequent myocardial infarction |
| **Larsen 2014** | (ICD10) | I21(410xx) | Acute myocardial infarction |

## ICH

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 430432852854 | Subarachnoid haemorrhageOther and unspecified intracranial hemorrhageSubarachnoid, subdural, and extradural hemorrhage, following injuryIntracranial injury of other and unspecified nature |
| **Coleman 2016** | (ICD10) | I61  | Intracerebral haemorrhage |
| **Bouillon 2015** | (ICD10) | I60I61I62S06.3S06.4S06.5S06.6 | Subarachnoid hemorrhageIntracranial haemorrhageOther nontraumatic intracranial haemorrhageFocal brain injuryEpidural haemorrhageTraumatic subdural haemorrhageTraumatic subarachnoid haemorrhage |
| **Maura 2015** | (ICD10) | I60I61I62S06.3 | Subarachnoid hemorrhageIntracranial haemorrhageOther nontraumatic intracranial haemorrhageFocal brain injury |
| **GorstRasmussen 2016** | (ICD10) | I60I61I62 | Subarachnoid hemorrhageIntracranial haemorrhageOther nontraumatic intracranial haemorrhage |
| **Larsen 2016** | (ICD10) | I60I61I62 | Subarachnoid hemorrhageIntracranial haemorrhageOther nontraumatic intracranial haemorrhage |
| **Yao 2016** | (ICD9) | 430431432852853 | Subarachnoid haemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageSubarachnoid, subdural, and extradural hemorrhage, following injuryOther and unspecified intracranial hemorrhage following injury |
| **Bengston 2016**  | (ICD9CM) | 430431 | Subarachnoid hemorrhageIntracerebral hemorrhage |
| **Halvorsen 2016**  | (ICD10) | I60I61I62I690I691I692 | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhageSequelae of subarachnoid haemorrhage Sequelae of intracerebral haemorrhage Sequelae of other nontraumatic intracranial  |
| **Francis 2015** | (ICD9) | 430431432852.0/2/4853.0 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageSubarachnoid subdural and extradural hemorrhage following injury (limited)Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound |
| **Tsadok 2016**  | (ICD10) | I60 (430)I61 (431)I62 (432) | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhage |
| **Alonso 2014** | (ICD9) | 430431432852 | Subarachnoid hemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhageSubarachnoid subdural and extradural hemorrhage following injury |
| **Larsen 2014** | (ICD10) | I60 (430.xx)I61 (431.xx)I62 (432.xx)S06.3CS06.4 S06.5 S06.6 | Subarachnoid haemorrhageIntracerebral haemorrhage Other nontraumatic intracranial haemorrhageFocal brain injuryEpidural haemorrhageTraumatic subdural haemorrhageTraumatic subarachnoid haemorrhage |
| **Graham 2014** | (ICD9) | 430431432852.0/2/4853.0 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageSubarachnoid subdural and extradural hemorrhage following injury (limited)Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound |
| **Larsen 2014** | (ICD10) | I60 (430)I61 (431)I62 (432.xx)S063CS064 S065 S066H356(36281) | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhage???Retinal haemorrhage? |
| **Larsen 2013** | (ICD10) | I60 (430)I61 (431)I62 (432x)S06.4 (800xx)S06.5 (800xx)S06.6 (800xx) | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhageEpidural haemorrhageTraumatic subdural haemorrhageTraumatic subarachnoid haemorrhage |
| **Seeger 2015** | (ICD9) | 430.x 431.x 432.x 432.1x  | Subarachnoid hemorrhage (SAH)Intracerebral hemorrhage (ICH)Other and unspecified intracranial hemorrhage, including subdural hemorrhage |
| **Chan 2016** | (ICD9) | 430431 432 | Subarachnoid hemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhage |
| **Villines 2015** | (ICD9) | 430431432.x | Subarachnoid hemorrhageIntracerebral hemorrhageOther nontraumatic intracranial haemorrhage |
| **Tsadok 2015** | (ICD9)(ICD10) | 430431432I60I61I62 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageSubarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhage |
| **Vaughan 2014**  | (ICD9) |  |  Intracranial Hemorrhage |
| **Hernandez2015** | (ICD9) | 430431432 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhage |

## GI bleed

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 531.0x531.2x532.0x532.2x533.0x533.2x534.0x534.2x537.83569.83578.xx | Acute gastric ulcer with hemorrhageAcute gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationAngiodysplasia of stomach and duodenum with hemorrhage Perforation of intestineGastrointestinal hemorrhage |
| **Abraham 2015** | (ICD9) | 455.x456.x530.82531.0531.6532.0532.6533.0533.6534.0534.6535.01535.61537.83562.xx568.81569.x578.x | HemorrhoidsVaricose veins of other sitesEsophageal hemorrhageGastric ulcer (limited)Duodenal ulcer (limited)Peptic ulcer, site unspecified (limited)Gastrojejunal ulcer (limited)Gastritis and duodenitis (limited)Angiodysplasia of stomach and duodenum with hemorrhage Diverticula of intestineOther specified disorders of peritoneum (limited)Other disorders of intestineGastrointestinal hemorrhage |
| **GorstRasmussen** |  (ICD10) | K25K26K27K28K29 | Gastric ulcerDuodenal ulcerPeptic ulcer, site unspecifiedGastrojejunal ulcerGastritis and duodenitis |
| **Yao 2016** | (ICD9) | 456.0/20530.21/7/82531.0x/2x/4x/6x532.0x/2x/4x/6x533.0x/2x/4x/6x534.0x/2x/4x/6x535.01/11/21/31/41/51/61/71537.83/84562.02/03/12/13568.81569.3/85578.x | Varicose veins of other sites (limited)Diseases of esophagus (limited)Gastric ulcer (limited)Duodenal ulcer (limited)Peptic ulcer, site unspecified (limited)Gastrojejunal ulcer (limited)Gastritis and duodenitis (limited)Other disorders of stomach and duodenumDiverticula of intestineOther specified disorders of peritoneum (limited)Bleeding rectalGastrointestinal hemorrhage |
| **Halvorsen 2016** | (ICD10) | K920K921K922K250K252K254K256K260K262K264K266K270K272K274K276K280K282K284K286K625K228K221K290I850 | HematemesisMelenaUnspecified GI bleedingGastric ulcer with bleedingGastric ulcer with both perforation and bleedingChronic or unspecified gastric ulcer with bleedingChronic or unspecified gastric ulcer with both perforation and bleedingDuodenal ulcer with bleedingDuodenal ulcer with both perforation and bleedingChronic or unspecified duodenal ulcer with bleedingChronic or unspecified gastric ulcer with both perforation and bleedingUnspecified peptic ulcer with bleedingUnspecified peptic ulcer with both perforation and bleedingChronic or unspecified peptic ulcer with bleedingChronic or unspecified peptic ulcer with both perforation and bleedingGastrojejunal ulcer with bleedingGastrojejunal ulcer with both perforation and bleedingChronic or unspecified gastrojejunal ulcer with bleedingChronic or unspecified gastric ulcer with both perforation and bleedingHaemorrhage from anus and rectumHaemorrhage of the oesophagusUlcer of oesophagus with bleedingAcute gastritis with bleedingOesophageal varices with bleeding |
| **Francis 2015** | (ICD9) | 455.2/5/8456.0/20459.0530.7/82531.0/2/4/6532.0532.2532.4532.6533.0533.2533.4533.6534.0534.2534.4534.6535.01535.11535.21535.31535.41535.51535.61537.83562.02/03/12/13568.81569.3/85578 | Internal hemorrhoids with other complication/External hemorrhoids with other complication/Unspecified hemorrhoids with other complicationEsophageal varices with bleeding/Esophageal varices in disease classified elsewhere,with bleedingHemorrhage, UnspecifiedGastroesophageal lacerationHemorrhage syndrome/Esophageal HemorrhageAcute gastric ulcer with Hemorrhage /Acute gastric ulcer with Hemorrhage and perforation /Chronic or Unspecified gastric ulcer with Hemorrhage /Chronic or Unspecified gastric ulcer with Hemorrhage and perforationAcute duodenal ulcer with HemorrhageAcute duodenal ulcer with Hemorrhage and Current Medical Research and Opinion perforationChronic or Unspecified duodenal ulcer with HemorrhageChronic or Unspecified duodenal ulcer with Hemorrhage and perforationAcute peptic ulcer of Unspecified site with HemorrhageAcute peptic ulcer of Unspecified site with Hemorrhage and perforationChronic or Unspecified peptic ulcer of Unspecified site with HemorrhageChronic or Unspecified peptic ulcer of Unspecified site with Hemorrhage and perforationAcute gastrojejunal ulcer with HemorrhageAcute gastrojejunal ulcer with Hemorrhage and perforationChronic or Unspecified gastrojejunal ulcer with HemorrhageChronic or Unspecified gastrojejunal ulcer with Hemorrhage and perforationAcute gastritis, with HemorrhageAtrophic gastritis, with Hemorrhagegastric mucosal hypertrophy, with HemorrhageAlcoholic gastritis, with HemorrhageOther specified gastritis, with HemorrhageUnspecified gastritis and gastroduodenitis, with HemorrhageDuodenitis, with HemorrhageAngiodysplasia of stomach and duodenum with Hemorrhage Current Medical Research and OpinionDiverticulosis of small intestine with Hemorrhage/Diverticulitis of small intestine with Hemorrhage/ Diverticulosis of colon with Hemorrhage/ Diverticulitis of colon with HemorrhageHemoperitoneum (nontraumatic)Hemorrhage of rectum and anus / Angiodysplasia of intestine with HemorrhageGastrointestinal Hemorrhage |
| **Tsadok 2016** | (ICD10) | K25.0 (531.0)K25.2 (531.2)K25.4 (531.4)K25.6 (531.6)K26.0 (532.0)K26.2 (532.2)K26.4 (532.4)K26.6 (532.6)K27.0 (533.0)K27.2 (533.2)K27.4 (533.4)K27.6 (533.6)K28.0 (534.0)K28.2 (534.2) K28.4 (534.4)K28.6 (534.6) K29.0 (535.0) K92.1 (578.1)K92.2 (578.2) | Acute gastric ulcer with hemorrhageAcute with both haemorrhage and perforationChronic or unspecified with haemorrhageChronic or unspecified with both haemorrhage and perforationAcute gastric ulcer with hemorrhageAcute with both haemorrhage and perforationChronic or unspecified with haemorrhageChronic or unspecified with both haemorrhage and perforationAcute gastric ulcer with hemorrhageAcute with both haemorrhage and perforationChronic or unspecified with haemorrhageChronic or unspecified with both haemorrhage and perforationAcute gastric ulcer with hemorrhageAcute with both haemorrhage and perforationChronic or unspecified with haemorrhageChronic or unspecified with both haemorrhage and perforationAcute haemorrhagic gastritisMelaenaGastrointestinal haemorrhage, unspecified |
| **Lauffenburger 2015** | (ICD9) | 455.2455.5455.8456.0456.20459.0530.82578 | Internal hemorrhoids with Other complicationExternal hemorrhoids with Other complicationUnspecified hemorrhoids with Other complicationEsophageal varices with bleedingEsophageal varices in diseases classified elsewhere, with bleedingHemorrhage, UnspecifiedEsophageal HemorrhageGastrointestinal Hemorrhage |
| **Alonso 2014** | ICD(9) | 455.2x/5x/8x456.0x/456.20530.7x 530.82 531.0x531.2x531.4x 531.6x 532.0x 532.2x 532.4x532.6x 533.0x533.2x 533.4x 533.6x 534.0x534.2x534.4x 534.6x535.01535.11535.21535.31535.41535.51535.61537.83562.03562.03 562.12 562.13 568.81 569.3x569.85 578.0x578.1x/578.9x | Internal hemorrhoids with other complication/Unspecified hemorrhoids with other complication/Esophageal varices with bleedingEsophageal varices in diseases classified elsewhere/Gastroesophageal lacerationhemorrhage syndromeEsophageal hemorrhageAcute gastric ulcer with hemorrhageAcute gastric ulcer with hemorrhage and perforationChronic or unspecified gastric ulcer with hemorrhageChronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhageChronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforationAcute gastritis, with hemorrhageAtrophic gastritis, with hemorrhageGastric mucosal hypertrophy, with hemorrhageAlcoholic gastritis, with hemorrhageOther specified gastritis, with hemorrhageUnspecified gastritis and gastroduodenitis, with hemorrhageDuodenitis, with hemorrhageAngiodysplasia of stomach and duodenum with hemorrhageDiverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhage Diverticulitis of colon with hemorrhage Hemoperitoneum (nontraumatic)Hemorrhage of rectum and anusHematemesis Blood in stool/Hemorrhage of gastrointestinal tract, unspecified |
| **Larsen 2014** | (ICD10) | K250 (531.xx)K260 (532.xx)K270 (533.xx)K280 (534.xx)K290 (535.xx) | Gastric ulcerDuodenal ulcerPeptic ulcer, site unspecifiedGastrojejunal ulcerAcute haemorrhagic gastritis |
| **Larsen 2014** | (ICD10) | K250(531.xx)K260 (532.xx)K270 (533.xx)K280 (534.xx)K290(535.xx) | Gastric ulcer Duodenal ulcerPeptic ulcer, site unspecifiedGastrojejunal ulcerAcute haemorrhagic gastritis |
| **Larsen 2013** | (ICD10) | K25(531xx)K26(532xx)K27(533xx)K28(533xx)K29(534xx) | Gastric ulcerDuodenal ulcerPeptic ulcer, site unspecifiedGastrojejunal ulcerGastritis and duodenitis |
| **Seeger 2015** | (ICD9) | Upper GI bleed531.0x/2x/4x/6x532.0x/2x/4x/6x533.0x/2x/4x/6x534.0x/2x/4x/6x578.0Lower GI bleeding562.02/03562.12/3569.3x/569.85578.1x578.9 | Upper GI bleed acute gastric ulcer with hemorrhage with/without obstruction/ chronic or unspecified gastric ulcer with hemorrhage with/without obstruction acute duodenal ulcer with hemorrhage with/without obstructionchronic or unspecified duodenal ulcer with hemorrhage with/without obstructionacute peptic ulcer of unspecified site with hemorrhage with/without obstructionchronic or unspecified peptic ulcer of unspecified site with hemorrhage with/without obstructionacute gastrojejunal ulcer with hemorrhage with/without obstructionchronic or unspecified gastrojejunal ulcer with hemorrhage with/without obstructionhematemesisLower GI bleedingDiverticulosis of small intestine with hemorrhage/Diverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhage/Diverticulitis of colon with hemorrhageHemorrhage of rectum and anus/Angiodysplasia of intestine with hemorrhageBlood in stoolHemorrhage of GI tract, unspecified |
| **Staerk2015** | (ICD10) | K25.0/2/6K26.0K26.2/6K27.0/2/6K28.0/2/6K29.0K29.8A | Acute gastric ulcer with hemorrhage/Acute gastric ulcer with both hemorrhage and perforation/Chronic or unspecified gastric ulcer with both hemorrhage and perforationAcute duodenal ulcer with hemorrhage/Acute duodenal ulcer with both hemorrhage and perforationChronic or unspecified duodenal ulcer with both hemorrhage and perforationAcute peptic ulcer, site unspecified, with hemorrhage/Acute peptic ulcer, site unspecified, with both hemorrhage and perforation/Chronic or unspecified peptic ulcer, site unspecified, with both hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhage/Acute gastrojejunal ulcer with both hemorrhage and perforation/Chronic or unspecified gastrojejunal ulcer with both hemorrhage and perforationAcute gastritisDuodenitis |
| **Chan 2016** | (ICD9) | 530.7 531.0/2/4/6532.0532.2 532.4 532.6 533.0 533.2533.4533.6 534.0534.2534.4 534.6535.01/11/21/31/41/51/61/71535.11 535.21 535.31535.41535.51 535.61 535.71 537.83 /537.84562.02 /562.03 562.12 /562.13 569.3/569.85578 | Gastroesophageal laceration hemorrhage syndromeAcute gastric ulcer with hemorrhage/Acute gastric ulcer with hemorrhage and perforation/Chronic or unspecified gastric ulcer with hemorrhage/Chronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhageChronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforationAcute gastritis, with hemorrhage/Atrophic gastritis, with hemorrhage/Gastric mucosal hypertrophy, with hemorrhage/Alcoholic gastritis, with hemorrhage/Other specified gastritis, with hemorrhage/Unspecified gastritis and gastroduodenitis, with hemorrhage/Duodenitis, with hemorrhage/Eosinophilic gastritis, with hemorrhageAngiodysplasia of stomach and duodenum with hemorrhage/Dieulafoy lesion (hemorrhagic) of stomach and duodenumDiverticulosis of small intestine with hemorrhage /Diverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhage/Diverticulitis of colon with hemorrhageHemorrhage of rectum and anus/Angiodysplasia of intestine with hemorrhageGastrointestinal hemorrhage |
| **Villines 2015** | (ICD9) | 531.0x /2x/4x/6x 532.0x532.2x 532.4x 532.6x 533.0x 533.2x533.4x533.6x 534.0x534.2x534.4x 534.6x578.0562.02 562.03 562.12 562.13 569.3x569.85578.1x578.9 | Acute gastric ulcer with hemorrhage/Acute gastric ulcer with hemorrhage and perforation/Chronic or unspecified gastric ulcer with hemorrhage/Chronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhageChronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforation hematemesisDiverticulosis of small intestine with hemorrhage Diverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhageDiverticulitis of colon with hemorrhageHemorrhage of rectum and anusAngiodysplasia of intestine with hemorrhageBlood in stoolHemorrhage of GI tract, unspecified |
| **Tsadok 2015** | (ICD9)(ICD10) | 530.7531.0/2/4/6532.0/2/4/6533.0/2/4/6534.0/2/4/6578K25.0/2/4/6K26.0/2/4/6K27.0/2/4/6K28.0/2/4/6K29.0K92.1/2 | Gastroesophageal laceration-hemorrhage syndrome Gastric ulcer (limited)Duodenal ulcer (limited)Peptic ulcer site unspecified (limited)Gastrojejunal ulcer (limited)Gastrointestinal hemorrhage |
| **Vaughan 2014**  | (ICD9) | Not reported | Gastrointestinal Hemorrhage |
| **Hernandez 2015** | (ICD9) | 530.7531.0/2/4/6532.0/2/4/6533.0/2/4/6534.0/2/4/6569.3535.01/11/21/31/41/51/61/71537.83/84562.02/03/12/13569.85578 | Gastroesophageal laceration-hemorrhage syndrome Gastric ulcer (limited)Duodenal ulcer (limited)Peptic ulcer site unspecified (limited)Gastrojejunal ulcer (limited)Hemorrhage of rectum and anus Gastritis and duodenitis (limited)Other disorders of stomach and duodenum (limited)Diverticula of intestine (limited)Angiodysplasia of intestine with hemorrhage Gastrointestinal hemorrhage |

## Major bleed

|  | **System** | **Codes** | **Codes description** |
| --- | --- | --- | --- |
| **LaLiberte 2014** | (ICD9) | 360.43362.81363.6162372.72376.32379.23423.0430431432568719852853854 | Hemophthalmos, except current injuryRetinal hemorrhageChoroidal hemorrhage (limited)Conjunctival hemorrhageOrbital hemorrhageVitreous hemorrhageHemopericardiumSubarachnoid hemorrhageIntracerebral hemorrhageOther unspecified intracranial hemorrhageHemoperitoneum (nontraumatic)HemarthrosisSubarachnoid, subdural, and extradural hemorrhage following injuryOther unspecified intracranial hemorrhage following injuryIntracranial injury of other and unspecified nature |
| **Larsen 2016** | (ICD10) | D62 J942 H113 H356 H431 N02 N95 R04 R31 R58 | Acute posthaemorrhagic anaemiaHemothoraxConjunctival hemorrhage, bilateralRetinal haemorrhageVitreous haemorrhageRecurrent and persistent haematuriaMenopausal and other perimenopausal disordersHaemorrhage from respiratory passagesUnspecified haematuriaHaemorrhage, not elsewhere classified |
| **Nelson 2016**  | (ICD9CM ) |  | validated algorithm developed by Cunningham et al. designed to identify hospitalizations related to bleeding |
| **Lip 2016** | (ICD9CM ) |  | Based on first listed diagnosis code in hospital claims |
| **Yao 2016** | (ICD9CM) | ICH: 430431432852853GI456.0/20530.21/7/82531.0x/2x/4x/6x532.0x/2x/4x/6x533.0x/2x/4x/6x534.0x/2x/4x/6x535.01/11535.21535.31/41535.51/61/71537.83/84562.02/03562.12/13568.81569.3569.85578.xOther sites423.0459.0596.7599.71719.1x784.8786.3 |  |
| **Halvorsen 2016** | (ICD10) | I60I61I62K920K921I690I691I692I230I312M250H431H356H313H450H448J942K661 | Subarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhageHaematemesisMelaenaSequelae of subarachnoid haemorrhageSequelae of intracerebral haemorrhage Sequelae of other nontraumatic intracranial haemorrhageHaemopericardium as current complication following acute myocardial infarctionHaemopericardium, not elsewhere classifiedHemarthrosisVitreous haemorrhageRetinal haemorrhageChoroidal haemorrhage and ruptureVitreous haemorrhage in diseases classified elsewhere Other disorders of the globe, haemophtlamosHaemothoraxHaemoperitoneum |
| **Lip 2016** | (ICD9CM ) |  | Based on first listed diagnosis code in hospital claims |
| **Francis 2015** | (ICD9) | 599.7719.1x786.3423.0593.81784.7784.8 | HematuriaHemarthrosisHemoptysisHemopericardiumVascular disorders of kidneyEpistaxisHemorrhage from throat |
| **Tsadok 2016**  | (ICD10) | H35.6(362.8) H43.1(379.2) I71.0(441.0)I71.1(441.1) I71.3(441.3,)I71.5(441.5) I71.8(441.8)N02(581.1)R31(599.7)R04.2(784.7)R04.0(786.3) | Retinal haemorrhageVitreous haemorrhageDissection of aorta [any part]Thoracic aortic aneurysm, rupturedAbdominal aortic aneurysm, rupturedThoracoabdominal aortic aneurysm, rupturedAortic aneurysm of unspecified site, rupturedRecurrent and persistent haematuriaUnspecified haematuriaHaemoptysisEpistaxis |
| **Lauffenburger 2015**  | (ICD9) | 423.0593.81599.7719.11784.7784.8786.3 | HemopericardiumVascular disorders of kidneyHematuriaHemarthrosis, shoulder regionEpistaxisHemorrhage from throatApnea |
| **Larsen 2014** | (ICD10) | D62 (285.1)J942(511.xx)H113(372.72)H356(362.81) H431(379.23)N02(581.1) N95 (627.xx)R04 (784.xx,786.xx)R31 (599.7x)R58(459.0)H35.6(362.81) | Acute posthaemorrhagic anaemiaHaemothoraxConjunctival haemorrhageRetinal haemorrhageVitreous haemorrhageRecurrent and persistent haematuriaMenopausal and other perimenopausal disordersHaemorrhage from respiratory passagesUnspecified haematuriaHaemorrhage, not elsewhere classifiedRetinal haemorrhage |
| **Graham 2014** | (ICD9) | 430/431/432852.0852.2852.4853.0336.1363.6372.72376.32377.42379.23719.1729.92729.97423.0593.81772.5866.01866.02866.11866.12990399049905990699079909P9010P9011P9016P9017P9019P9020 P9021P9022P9023P9031P9032P9033P9034P9035P9036P9037P9038P9039P9040P9044P9051 P9052P9053P9054P9055P9056P9057P9058P9059P90600380038103820383038403850386038703880389039003910392039937/38/39 | Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageSubarachnoid hemorrhage following injury without mention of open intracranial woundSubdural hemorrhage following injury without mention of open intracranial woundExtradural hemorrhage following injury without mention of open intracranial woundOther and unspecified intracranial hemorrhage following injury without mention of open intracranial woundVascular myelopathiesChoroidal hemorrhage and ruptureConjunctival hemorrhageOrbital hemorrhageHemorrhage in optic nerve sheathsbillable medical code that can be used to indicate a diagnosis on a reimbursement claimHemarthrosisNontraumatic hematoma of soft tissueHemopericardiumVascular disorders of kidneyAdrenal hemorrhage of fetus or newbornInjury to kidney without mention of open wound into cavity, hematoma without rupture of capsuleInjury to kidney without mention of open wound into cavity, laceration Injury to kidney with open wound into cavity, hematoma without rupture of capsuleInjury to kidney with open wound into cavity, lacerationOther Transfusion Of Whole BloodTransfusion Of Packed CellsTransfusion Of PlateletsTransfusion Of Coagulation FactorsTransfusion Of Other SerumTransfusion Of Other SubstanceBlood (whole), for transfusion, per unitBlood, split unitRed blood cells, leukocytes reduced, each unitFresh frozen plasma (single donor), frozen within 8 hours of collection, each unitPlatelets, each unitPlatelet rich plasma, each unitRed blood cells, each unitRed blood cells, washed, each unitPlasma, pooled multiple donor, solvent/detergent treated, frozen, each unitPlatelets, leukocytes reduced, each unitPlatelets, irradiated, each unitPlatelets, leukocytes reduced, irradiated, each unitPlatelets, pheresis, each unitPlatelets, pheresis, leukocytes reduced, each unitPlatelets, pheresis, irradiated, each unitPlatelets, pheresis, leukocytes reduced, irradiated, each unitRed blood cells, irradiated, each unitRed blood cells, deglycerolized, each unitRed blood cells, leukocytes reduced, irradiated, each unitPlasma, cryoprecipitate reduced, each unitWhole blood or red blood cells, leukocytes reduced, cmvnegative, each unitPlatelets, hlamatched leukocytes reduced, apheresis/pheresis, each unitPlatelets, pheresis, leukocytes reduced, cmvnegative, irradiated, each unitWhole blood or red blood cells, leukocytes reduced, frozen, deglycerol, washed, each unitPlatelets, leukocytes reduced, cmvnegative, apheresis/pheresis, each unitWhole blood, leukocytes reduced, irradiated, each unitRed blood cells, frozen/deglycerolized/washed, leukocytes reduced, irradiated, each unitRed blood cells, leukocytes reduced, cmvnegative, irradiated, each unitFresh frozen plasma between 824 hours of collection, each unitFresh frozen plasma, donor retested, each unit |
| **Larsen 2014** | (ICD10) | D62 (2851)J942(511.xx)H113(37272)H356(36281) H431(37923)N02(5811) N95 ()R04 ()R31 ()R58(4590) | Acute posthaemorrhagic anaemiaHaemothoraxConjunctival haemorrhageRetinal haemorrhageVitreous haemorrhageRecurrent and persistent haematuriaMenopausal and other perimenopausal disordersHaemorrhage from respiratory passagesUnspecified haematuriaHaemorrhage, not elsewhere classified |
| **Larsen 2013** | (ICD10) | MajorD62.9(285x)J94.2(511x)N02(581x)R04(784x)R31(599xx)R58(459x)N95(627x)ICHI60(430)I61(431)I62(432x)S06.4(800xx)S06.5(800xx)S06.6(800xx)GI BLEEDK25(531xx)K26(532xx)K27(533xx)K28(533xx)K29(534xx) | MajorAcute posthemorrhagic anemiaHaemothoraxRecurrent and persistent haematuriaHaemorrhage from respiratory passagesUnspecified haematuriaHaemorrhage, not elsewhere classifiedMenopausal and other perimenopausal disordersICHSubarachnoid haemorrhageIntracerebral haemorrhageOther nontraumatic intracranial haemorrhageEpidural haemorrhageTraumatic subdural haemorrhageTraumatic subarachnoid haemorrhageGI BLEEDGastric ulcerDuodenal ulcerPeptic ulcer, site unspecifiedGastrojejunal ulcerGastritis and duodenitis |
| **Seeger 2015** | (ICD9) | Upper GI bleed 531.0x 531.2x 531.4x531.6x532.0x532.2x532.4x532.6x533.0x533.2x533.4x533.6x534.0x534.2x 534.4x 534.6x 578.0Lower GI bleeding562.02562.03562.12562.13569.3x569.85578.1x578.9Urogenital bleed599.7 626.2x280.0285.1285.9Other bleed719.1x423.0x786.3x784.7x459.0x285.1x | Upper GI bleed Acute gastric ulcer with hemorrhage with/without obstruction with hemorrhage and perforation with/without obstructionChronic or unspecified gastric ulcer with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionAcute duodenal ulcer with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionChronic or unspecified duodenal ulcer with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionAcute peptic ulcer of unspecified site with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionChronic or unspecified peptic ulcer of unspecified site with hemorrhage with/without obstructionAcute gastrojejunal ulcer with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionChronic or unspecified gastrojejunal ulcer with hemorrhage with/without obstruction with hemorrhage + perforation with/without obstructionHematemesisLower GI bleedingDiverticulosis of small intestine with hemorrhageDiverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhageDiverticulitis of colon with hemorrhageHemorrhage of rectum and anusAngiodysplasia of intestine with hemorrhageBlood in stoolHemorrhage of GI tract, unspecifiedUrogenital bleedHematuriaExcessive/frequent menstruationIron deficiency anemia secondary to blood loss (chronic)Acute posthemorrhagic anemiaAnemia, unspecifiedOther bleedHemathrosisHemopericardiumHemoptysisEpistaxisHemorrhage not specified Acute posthemorrhagic anemia  |
| **Staerk 2015** | (ICD10) | K25.0K25.2K25.6K26.0K26.2K26.6K27.0K27.2K27.6K28.0K28.2K28.6K29.0K29.8A | Acute gastric ulcer with hemorrhageAcute gastric ulcer with both hemorrhage and perforationChronic or unspecified gastric ulcer with both hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with both hemorrhage and perforationChronic or unspecified duodenal ulcer with both hemorrhage and perforationAcute peptic ulcer, site unspecified, with hemorrhageAcute peptic ulcer, site unspecified, with both hemorrhage and perforationChronic or unspecified peptic ulcer, site unspecified, with both hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with both hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with both hemorrhage and perforationAcute gastritisDuodenitis |
| **Pallisgaard 2015** | (ICD10) | I60I61I690I691N02R31K228FK251K252K254K256K260 K262K264 K266K270K272K274K625K633K638BK638CK850K922 | Subarachnoid haemorrhageIntracerebral haemorrhage Sequelae of subarachnoid haemorrhageSequelae of intracerebral haemorrhageRecurrent and persistent haematuria Unspecified haematuria Other specified diseases of oesophagusAcute gastric ulcer with perforationAcute with both haemorrhage and perforation Chronic or unspecified with haemorrhage Chronic or unspecified with both haemorrhage and perforation Acute with haemorrhage Acute with both haemorrhage and perforation Chronic or unspecified with haemorrhage chronic or unspecified with both haemorrhage and perforation Peptic ulcer, site unspecified : acute with haemorrhage Peptic ulcer, site unspecified : acute with both haemorrhage and perforationPeptic ulcer, site unspecified : chronic or unspecified with haemorrhageHaemorrhage of anus and rectumUlcer of intestineOther specified diseases of intestineOther specified diseases of intestineIdiopathic acute pancreatitisGastrointestinal haemorrhage, unspecified |
| **Villines 2015** | (ICD9) | 599.7x626.2x280.0285.1285.9719.1x423.0x786.3x784.7x459.0x285.1x | HamaturiaExcessive or frequent menstruationIron deficiency anemia secondary to blood loss (chronic)Acute posthemorrhagic anemiaAnemia, unspecifiedHemathrosisHemopericardiumHemoptysisEpistaxisHemorrhage not specifiedAcute posthemorrhagic anemia |
| **Pallisgaard 2015** | (ICD10) | I60I61I690I691N02R31K228FK251K252K254K256K260 K262K264 K266K270K272K274K625K633K638BK638CK850K922 | Subarachnoid haemorrhageIntracerebral haemorrhage Sequelae of subarachnoid haemorrhageSequelae of intracerebral haemorrhageRecurrent and persistent haematuria Unspecified haematuria Other specified diseases of oesophagusAcute gastric ulcer with perforationAcute with both haemorrhage and perforation Chronic or unspecified with haemorrhage Chronic or unspecified with both haemorrhage and perforation Acute with haemorrhage Acute with both haemorrhage and perforation Chronic or unspecified with haemorrhage Chronic or unspecified with both haemorrhage and perforation Peptic ulcer, site unspecified : acute with haemorrhage Peptic ulcer, site unspecified : acute with both haemorrhage and perforationPeptic ulcer, site unspecified : chronic or unspecified with haemorrhageHaemorrhage of anus and rectumUlcer of intestineOther specified diseases of intestineOther specified diseases of intestineIdiopathic acute pancreatitisGastrointestinal haemorrhage, unspecified |
| **Tsadok 2015** | (ICD9)(ICD10) | ICH(ICD9)430431432(ICD10)I60I61I62GI Bleed(ICD9)530.7531.0531.2531.4531.6532.0532.2532.4532.6533.0533.2533.4533.6534.0534.2534.4534.6578(ICD10)K25.0 K25.2K25.4K25.6K26.0K26.2K26.4K26.6K27.0K27.2K27.4K27.6K28.0K28.2K28.4K28.6K29.0K92.1K92.2Other hemorrhage(ICD9)362.8379.2441.0441.1441.3459578.0599.7784.7786.3(ICD10)H35.6H43.1I71.0I71.1I71.3I71.5I71.8N02R31R04.2R04.0 | ICH (ICD9)Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageICH (ICD10)Subarachnoid hemorrhageIntracerebral hemorrhageOther and unspecified intracranial hemorrhageGI Bleed (ICD9)Gastroesophageal lacerationhemorrhage syndromeAcute gastric ulcer with hemorrhageAcute gastric ulcer with hemorrhage and perforationChronic or unspecified gastric ulcer with hemorrhageChronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhageChronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforationGastrointestinal hemorrhageGI Bleed (ICD10)Acute gastric ulcer with hemorrhageAcute gastric ulcer with hemorrhage and perforationChronic or unspecified gastric ulcer with hemorrhageChronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhageChronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforationGastrointestinal hemorrhageMelaenaGastrointestinal haemorrhage, unspecifiedOther hemorrhage (ICD9)Other retinal disordersDisorders of vitreous bodyDissection of aortaThoracic aneurysm, ruptured Abdominal aneurysm, rupturedOther disorders of circulatory systemHematemesis HematuriaEpistaxisHemoptysisOther hemorrhage (ICD10)Other retinal disordersDisorders of vitreous bodyDissection of aortaThoracic aneurysm, ruptured Abdominal aneurysm, rupturedThoracoabdominal aortic aneurysm, rupturedAortic aneurysm of unspecified site, rupturedRecurrent and persistent haematuriaRecurrent and persistent haematuriaHemoptysisEpistaxis |
| **Pallisgaard 2016** | (ICD10) | I60(430)I61(431)I62(432x)I69.0I69.1I69.2J94.2(511x)K25.0(531xx)K25.4(531xx)K26.0(532xx)K26.4(532xx)K27.0(533xx) K28.0(534xx)K92.1(578x)K92.0(578x)K92.2(578x)N02(581x)R02R31(599xx)S06.4(800x)S06.5(800x)S06.6(800x)K25.2(531xx)K25.6(531xx)K26.0(532xx)K26.(532xx)K26.6(532x)K27.0(533xx)K27.2(533xx)K27.6(533xx)K28.0(534xx)K28.2(534xx)K28.6(534xx)K29.0((535xx))K29.8A(535xx) | Subarachnoid haemorrhageIntracerebral haemorrhage Other nontraumatic intracranial haemorrhageSequelae of subarachnoid haemorrhageSequelae of intracerebral haemorrhageSequelae of other nontraumatic intracranial haemorrhageHaemothoraxGastric ulcerGastric ulcer chronic or unspecified with haemorrhageDuodenal ulcer : acute with haemorrhage Duodenal ulcer : chronic or unspecified with haemorrhage Peptic ulcer, site unspecified : chronic or unspecified with both haemorrhage and perforation Gastrojejunal ulcer : acute with haemorrhage Melaena HaematemesisGastrointestinal haemorrhage, unspecifiedRecurrent and persistent haematuriaGangrene, not elsewhere classifiedUnspecified haematuriaEpidural haemorrhage Traumatic subdural haemorrhage Traumatic subarachnoid haemorrhage Gastric ulcer : acute with both haemorrhage and perforation Gastric ulcer : chronic or unspecified with both haemorrhage and perforation Duodenal ulcer : acute with haemorrhage Duodenal ulcer : acute with both haemorrhage and perforation Duodenal ulcer : chronic or unspecified with both haemorrhage and perforation Peptic ulcer, site unspecified : acute with haemorrhage Peptic ulcer, site unspecified : acute with both haemorrhage and perforation Peptic ulcer, site unspecified : chronic or unspecified with both haemorrhage and perforation Gastrojejunal ulcer : acute with haemorrhage Gastrojejunal ulcer : acute with both haemorrhage and perforation Gastrojejunal ulcer : chronic or unspecified with both haemorrhage and perforation Acute haemorrhagic gastritis Duodenitis |
| **Sorenson 2013** | (ICD10) | I60(430)I62(432x)S06.4(800x)S06.5(800x)S06.6(800x)J94.2(511x)R04(784x)K25.0(531xx)K25.2(531xx)K25.4(531xx)K26.0(532xx)K26.2(532xx)K26.4(532xx)K27.0(533xx)K27.2(533xx)K28.0(534xx)K28.2(534xx)K92.0(578x)K92.1(578x)K92.2(578x)R31(599xx) | Subarachnoid haemorrhageOther nontraumatic intracranial haemorrhageEpidural haemorrhageTraumatic subdural haemorrhageTraumatic subarachnoid haemorrhageHaemothoraxHaemorrhage from respiratory passagesGastric ulcer : acute with haemorrhage Gastric ulcer : acute with both haemorrhage and perforation Gastric ulcer : chronic or unspecified with haemorrhage Duodenal ulcer : acute with haemorrhage Duodenal ulcer : acute with both haemorrhage and perforation Duodenal ulcer : chronic or unspecified with haemorrhage Peptic ulcer, site unspecified : acute with haemorrhage Peptic ulcer, site unspecified : acute with both haemorrhage and perforation Gastrojejunal ulcer : acute with haemorrhage Gastrojejunal ulcer : acute with both haemorrhage and perforation HaematemesisMelaenaGastrointestinal haemorrhage, unspecifiedUnspecified haematuria |
| **Smythe 2014** | (ICD9) | Not reported | Hemorrhage |
| **Vaughan 2014** | (ICD9) | Not reported | Any BleedingGastrointestinal HemorrhageIntracranial HemorrhageHemorrhagee Other Site |
| **Hernandez 2015** | (ICD9) | ICH430431432GI Bleed530.7531.0531.2531.4531.6532.0532.2532.4532.6533.0533.2533.4533.6534.0534.2534.4 534.6569.3535.01535.11535.21535.31535.41535.51535.61535.71537.83537.84562.02562.03 562.12562.13569.85578  |  ICHSubarachnoid hemorrhageIntracerebral hemorrhage Other and unspecified intracranial hemorrhageGI BleedGastroesophageal lacerationhemorrhage syndromeAcute gastric ulcer with hemorrhage Acute gastric ulcer with hemorrhage and perforationChronic or unspecified gastric ulcer with hemorrhageChronic or unspecified gastric ulcer with hemorrhage and perforationAcute duodenal ulcer with hemorrhageAcute duodenal ulcer with hemorrhage and perforationChronic or unspecified duodenal ulcer with hemorrhageChronic or unspecified duodenal ulcer with hemorrhage and perforationAcute peptic ulcer of unspecified site with hemorrhageAcute peptic ulcer of unspecified site with hemorrhage and perforationChronic or unspecified peptic ulcer of unspecified site with hemorrhage Chronic or unspecified peptic ulcer of unspecified site with hemorrhage and perforationAcute gastrojejunal ulcer with hemorrhageAcute gastrojejunal ulcer with hemorrhage and perforationChronic or unspecified gastrojejunal ulcer with hemorrhageChronic or unspecified gastrojejunal ulcer with hemorrhage and perforationHemorrhage of rectum and anus Acute gastritis, with hemorrhageAtrophic gastritis, with hemorrhageGastric mucosal hypertrophy, with hemorrhageAlcoholic gastritis, with hemorrhageOther specified gastritis, with hemorrhageUnspecified gastritis and gastroduodenitis, with hemorrhageDuodenitis, with hemorrhageEosinophilic gastritis, with hemorrhageAngiodysplasia of stomach and duodenum with hemorrhageDieulafoy lesion (hemorrhagic) of stomach and duodenum Diverticulosis of small intestine with hemorrhageDiverticulitis of small intestine with hemorrhageDiverticulosis of colon with hemorrhageDiverticulitis of colon with hemorrhageAngiodysplasia of intestine with hemorrhageGastrointestinal hemorrhage |

# Quality assessment of studies included in the analysis (Downs and Black checklist)

1. Is the hypothesis/aim/objective of the study clearly described? Y/N
2. Are the main outcomes to be measured clearly described in the Introduction or Methods section? Y/N
3. Are the characteristics of the patients included in the study clearly described ? Y/N
4. Are the interventions of interest clearly described? Y/N
5. Are the distributions of principal confounders in each group of subjects to be compared clearly described?
6. Are the main findings of the study clearly described? Y/N
7. Does the study provide estimates of the random variability in the data for the main outcomes? Y/N
8. Have all important adverse events that may be a consequence of the intervention been reported? Y/N
9. Have the characteristics of patients lost to follow-up been described? Y/N
10. Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001? Y/N
11. Were the subjects asked to participate in the study representative of the entire population from which they were recruited? Y/N/UTD
12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited? Y/N/UTD
13. Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive? Y/N/UTD
14. Was an attempt made to blind study subjects to the intervention they have received ? Y/N/UTD
15. Was an attempt made to blind those measuring the main outcomes of the intervention? Y/N/UTD
16. If any of the results of the study were based on “data dredging”, was this made clear? Y/N/UTD
17. In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls ? Y/N/UTD
18. Were the statistical tests used to assess the main outcomes appropriate? Y/N/UTD
19. Was compliance with the intervention/s reliable? Y/N/UTD
20. Were the main outcome measures used accurate (valid and reliable)? Y/N/UTD
21. Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population? Y/N/UTD
22. Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time? Y/N/UTD
23. Were study subjects randomised to intervention groups? Y/N/UTD
24. Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable? Y/N/UTD
25. Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? Y/N/UTD
26. Were losses of patients to follow-up taken into account? Y/N/UTD
27. Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%? Sample sizes have been calculated to detect a difference of x% and y%.

| **Reference** | **Full text/Abstract** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lauffenburger 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | N/A |
| Abraham 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Armbruster 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Brais 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Nelson 2014 | Full text | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Labaf 2014 | Full text | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 0 | 0 | N/A |
| LaLiberte 2014 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Sorenson 2013  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Ho 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Providencia 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Hernandez 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Larsen 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Vaughan 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 0 | 0 | N/A |
| Larsen 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Larsen 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Lakkireddy 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Kaiser 2013  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Larsen 2013  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 0 | 0 | N/A |
| Ho 2012 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Graham 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Smythe 2014 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Bengtson 2014  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Avgil 2014  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Choi 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | N/A | N/A | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Seeger 2013 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Avgil 2013  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Alonso 2013 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Zalesak 2013 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Bassiouny 2013  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Lakkireddy 2013 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Bergman 2013  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Kim 2013 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Thelus 2012 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Ellis 2012  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| CNAMTS + ANSM 2014  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| ANSM + CNAMTS 2014 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Avgil 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | 0 | 0 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Avgil 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Coleman 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Di Biase 2015  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Franco 2015  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lau 2015  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lin 2015  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lip 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Luger 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | N/A | N/A | 0 | 1 | 1 |  | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Maura 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Nagao 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | N/A |
| Nyman 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Pallisgaard 2015 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Seeger 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  | 1 | 0 | 1 | N/A | N/A | 0 | 1 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Shiga 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 1 | N/A |
| Snipelisky 2014 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | N/A | N/A | 0 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Staerk 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Tziomalos 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Villines 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Bouillon 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 1 |  | 0 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Yao 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Coleman 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Larsen 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Nelson 2016  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lamberts 2016  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lip 2016 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Deitelzweig 2016  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Wong 2016 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Norby 2016  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Kodani 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Chan 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Kamble 2015  | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Amin 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Seeger 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Lip 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Charlton 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Alpesh 2015 | Abstract |  |  |  |  |  |  |  |  |  |  |  |  |  | N/A | N/A |  |  |  |  |  |  |  | N/A | N/A |  |  | N/A |
| Nishtala 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Chan 2015  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |
| Gorst-Rasmussen 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Chan 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 1 | 1 | N/A |
| Korenstta 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Okumura 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Chan 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 1 | 0 | N/A |
| Ellis 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Pallisgaad 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Yap 2016 | Full text | 1 | 1 | 1 | 1 |  | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 0 | 1 | N/A | N/A | 1 | 0 | N/A |
| Coleman 2016  | Full text | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Marler 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Yavuz, 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Beyer-Westendorf 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Naganuma 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 0 | N/A | N/A | 0 | 0 | N/A |
| Li 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |  | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | N/A |
| Bengtson 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Halvorsen, 2016 | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |  | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 0 | 1 | N/A | N/A | 1 | 0 | N/A |
| Johnson 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Staerk, 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Lip 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 0 | N/A |
| Lip 2016  | Full text | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A | 0 | 0 | N/A |

# Specific information on studies included in the analysis

| **Reference** | **Country** |  |  |  |
| --- | --- | --- | --- | --- |
| Lauffenburger 2015  | US | Claims analysis | • Dabigatran: 67.5 (12.4)• Warfarin: 71.4 (12.2) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Abraham 2015  | US | Claims analysis | Dabiatran vs. Warfarin:• Dabigatran: 67.2 (11.2)• Warfarin: 67.5 (11.2)Rivaroxaban vs. Warfarin:• Rivaroxaban: 69.0 (10.9)• Warfarin: 69.1 (10.9) | Adjusted on Safety/Baseline characteristics |
| Armbruster 2015 | US | Registry | • Warfarin: 63.9 (10.1)• Dabigatran: 60.8 (9.4)• Rivaroxaban: 60.3 (9)• Apixaban: 62.2 (12.2) | No adjustment |
| Brais 2015 | Canada | Chart review | • Dabigatran: 72.51 ± 14.84 • Warfarin: 80.03 ± 9.37  | No adjustment |
| Nelson 2014 | US | Claims analysis | • Rivaroxaban: 71.6 (11.8) • Warfarin (PS matched): 71.6 (11.7) | Adjusted on Effectiveness/Baseline characteristics |
| Labaf 2014 | Sweden | Cohort and case-control | • Total NOACs: 70.5 (10.3)-Dabigatran 110mg: 77.2 (8.5)-Dabigatran 150mg: 66.0 (9.2)-Rivaroxaban 15mg: 81.9 (7.3)-Rivaroxaban 20mg: 71.1 (8.1)• Warfarin: 75.0 (9.6) | Adjusted on Baseline characteristics |
| LaLiberte 2014 | US | Claims analysis | • Rivaroxaban: 73.3 (8.4)• Warfarin: 73.7 (8.3) | Adjusted on Safety/Baseline characteristics |
| Sorenson 2013  | Denmark | Registry | • Dabigatran 110 mg: 67.9 (±8.15)• Dabigatran 150 mg: 79.6 (±8.3)• Warfarin 2.5 mg: 73.5 (±10.0) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Ho 2015  | China | Registry | • Dabigatran: 74.5 ± 9.5• Warfarin (1R): 77.5 ± 8.8• Warfarin (2Q): 76.7 ± 8.5• Warfarin (3Q): 75.7 ± 8.5• Warfarin (4Q): 74.8 ± 8.8• Aspirin: 80.3±8.8• No Aspirin or Warfarin: 80.6±9.4 | Adjusted on Baseline characteristics |
| Providencia 2014  | France | Cohort study | • VKA: 62.9 ± 8.3• Rivaroxaban: 60.1 ± 9.9• Dabigatran: 59.8 ± 9.8 | No adjustment |
| Hernandez 2015  | US | Cohort study | Before propensity score weighting• Dabigatran: 75.7 (8.5)• Warfarin: 75.0 (10.4)After propensity score weighting• Dabigatran: 75.1 (10.2)• Warfarin: 75.6 (9.5) | Adjusted on Effectiveness/Baseline characteristics |
| Larsen 2014  | Denmark | Registry | VKA-naïve, median:• Warfarin: 76• Dabigatran 110 mg: 83• Dabigatran 150 mg: 69VKA-experienced, median:• Warfarin: 75• Dabigatran 110 mg: 82• Dabigatran 150 mg: 70 | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Vaughan 2014  | US | Cohort study | • Dabigatran: 69.7 (9.0)• Warfarin: 74.4 (10.1) | Adjusted on Effectiveness/Baseline characteristics |
| Larsen 2014  | Denmark | Registry | VKA-naïve, median (IQR):• Warfarin: 73 (66-80)• Dabigatran 110 mg: 82 (77-86)• Dabigatran 150 mg: 67 (62-72)VKA-experienced, %:• Warfarin: 74 (67-81)• Dabigatran 110 mg: 82 (77-86)• Dabigatran 150 mg: 69 (64-73) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Larsen 2014  | Denmark | Registry | VKA-naïve, median:• Warfarin: 72• Dabigatran 110 mg: 82• Dabigatran 150 mg: 68VKA-experienced, median:• Warfarin: 75• Dabigatran 110 mg: 82• Dabigatran 150 mg: 69 | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Lakkireddy 2014  | US | Registry | • Rivaroxaban: 63 ±10• Warfarin: 63 ±10 | No adjustment |
| Kaiser 2013  | US | Cohort study | • Dabigatran: 58±11• Warfarin: 64±10 | No adjustment |
| Larsen 2013  | Denmark | Registry | • Dabigatran 110 mg: 74.7 (11.8)• Dabigatran 150 mg: 67.4 (8.5)• Warfarin: 70.4 (12.6) | Adjusted on Baseline characteristics |
| Ho 2012 | China | Chart review | • Dabigatran: 70.0 ± 11.4• Warfarin: 70.1 ± 10.3 | Adjusted on Baseline characteristics |
| Graham 2015 | US | Claims analysis | • Dabigatran: - 65–74: 42%- 75–84: 43%- ≥85: 16%• Warfarin:- 65–74: 41%- 75–84: 43%- ≥85: 16% | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Smythe 2014 | US | Chart review | Not reported  | No adjustement |
| Bengtson 2014  | US | Claims analysis | Not reported  | Adjusted on Baseline characteristics |
| Avgil 2014  | Canada | Database analysis | Not reported  | Adjusted on Baseline characteristics |
| Choi 2014  | US | Cross-sectional | • Dabigatran: 69 (12)• Warfarin: 68 (9.12) | No adjustment |
| Seeger 2013 | US | Claims analysis | Prior to PS matching• Dabigatran: 62.4 ± 10.8• Warfarin: 64.7 ± 11.5After PS matching• Dabigatran: 63.9 ± 11.0• Warfarin: 63.3 ± 11.0 | Adjusted on Effectiveness/Baseline characteristics |
| Avgil 2013  | Canada | Cohort study | Not reported  | Adjusted on Effectiveness/Safety |
| Alonso 2013 | US | Claims analysis | Not reported  | Adjusted on Effectiveness/Baseline characteristics |
| Zalesak 2013 | US | Claims analysis | • Dabigatran (before PS match): 73.0 (9.7)• Dabigatran (after PS match): 73.2 (9.7)• Warfarin (before PS match): 72.8 (10.8)• Warfarin (after PS match): 72.8 (10.8) | Adjusted on Safety/Baseline characteristics |
| Bassiouny 2013  | US | Cohort study | • Dabigatran 150mg (before PS match): 58.6 ± 11.0• Warfarin uninterrupted (before PS match): 62.7 ± 9.6• Dabigatran 150mg (after PS match): 60.0 ± 10.0• Warfarin uninterrupted (after PS match): 60.1 ± 10.4 | Adjusted on Baseline characteristics |
| Lakkireddy 2013 | US | Registry | Mean age of the population was 62 +/-9 | Adjusted on Baseline characteristics |
| Bergman 2013  | Sweden | Chart review | • Dabigatran: 70.4 ± 10.0• Warfarin: 75.0 ± 9.6 | No adjustment |
| Kim 2013 | US | Case-control | • Dabigatran 150mg: 61 ± 10• Warfarin uninterrupted: 61 ± 10 | Adjusted on Safety/Baseline characteristics |
| Thelus 2012 | US | Claims analysis | • Dabigatran: 74• Warfarin: 76 | Adjusted on Baseline characteristics |
| Ellis 2012  | US | Cohort study | Not reported | No adjustment |
| CNAMTS + ANSM 2014  | France | Databse analysis | • Dabigatran 150: 66.0±10 • Dabigatran: 73.3±12 • Rivaroxaban 10 or 15: 70.1±16• Rivaroxaban 20: 67.0±13• Rivaroxaban: 68.4±15 | Adjusted on Baseline characteristics |
| ANSM + CNAMTS 2014 | France | Databse analysis | • DOAC: 72.8 (11.5)• VKA: 72.9 (11.4) | No adjustment |
| Avgil 2015  | Canada | Database analysis | • Men: 76.3 (9.3) • Women: 80.3 (8.8) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Avgil 2016  | Canada | Cohort study | 78.3 (9.3) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Coleman 2016  | Germany | Database analysis | • Rivaroxaban: 74.0 (10.7)• VKA: 74.4 (9.9) | Adjusted on Baseline characteristics |
| Di Biase 2015  | US, Europe | Registry | 65.9 (9.9) | Adjusted on Baseline characteristics |
| Franco 2015  | Italy | Cohort study | • Apixaban: 81 (5)• Dabigatran: 74 (5)• Rivaroxaban: 80 (6)• Warfarin: 77 (6) | No adjustment |
| Lau 2015  | China (Hong Kong) | Database analysis | Not reported  | Unclear |
| Lin 2015  | US | Database analysis | Not reported  | Adjusted on Safety/Baseline characteristics |
| Lip 2015 | US | Database analysis | • Apixaban: 69.3±12.3• Dabigatran: 66.8±12.1• Rivaroxaban: 67.3±12.2 • Warfarin: 72.5±11.9  | Adjusted on Baseline characteristics |
| Luger 2015 | Germany | Registry | • VKA: 77.4 (8.0)• Dabigatran: 74.2 (10.4)• Rivaroxaban: 78.2 (8.6) | Adjusted on Baseline characteristics |
| Maura 2015  | France | Database analysis | Dabigatran vs. VKA:• Dabigatran: 74.0 (11.3)• VKA: 73.9 (11.2)Rivaroxaban vs. VKA:• Rivaroxaban: 73.6 (11.4)• VKA: 73.4 (11.2) | Adjusted on Safety/Baseline characteristics |
| Nagao 2015 | Japan | Cohort study | Before PSM• Apixaban: 61 ± 13• Warfarin: 62 ± 9After PSM• Apixaban: 61 ± 13• Warfarin: 61 ± 13 | No adjustment |
| Nyman 2015 | Sweden | Cohort study | Not reported | Not reported  |
| Pallisgaard 2015 | Denmark | Cohort study | Median (IQR)• Dabigatran: 66.3 (59.3–72.6)• Warfarin: 67.4 (60.8–72.5) | Adjusted on Baseline characteristics |
| Seeger 2015  | US | Database analysis | MarketScan (PS matched cohort)• Dabigatran: 68.73 (12.0)• Warfarin: 68.33 (12.2)Clinformatics (PS matched cohort)• Dabigatran: 63.36 (10.86)• Warfarin: 63.05 (10.86) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Shiga 2015  | Japan | Cohort study | • Apixaban: 70 ± 10• Dabigatran: 70 ± 9• Rivaroxban: 70 ± 10• Warfarin: 68 ± 13 | No adjustment |
| Snipelisky 2014 | US | Chart review | • Warfarin: 66.5• Dabigatran: 65.3 • Rivaroxaban: 68.4 | No adjustment |
| Staerk 2015  | Denmark | Registry | • OAC-naive warfarin: 70.3 ±11.3• OAC-naive dabigatran 110: 80.0 ± 8.7• OAC-naive dabigatran 150: 65.9 ± 8.7• OAC-experienced dabigatran 110: 79.6 ± 8.1• OAC-experienced dabigatran 150: 67.7 ± 8.5  | Adjusted on Effectiveness/Baseline characteristics |
| Tziomalos 2015 | Greece | Cohort study | 78.5±6.3  | Not reported  |
| Villines 2015  | US | Cohort study | After PSM• Dabigatran: 73.8 ± 9.3• Warfarin: 74.0 ± 9.0 | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Bouillon 2015  | France | Database analysis | • NOAC: 75 (67–82)• VKA: 75 (67–82) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Yao 2016 | US | Claims analysis | Median (IQR)Apixaban vs warfarin• Apixaban: 73 (66–81)• Warfarin: 73 (66–81)Dabigatran vs warfarin • Dabigatran: 70 (62–78)• Warfarin: 70 (61–78Rivaroxaban vs warfarin• Rivaroxaban: 72 (64–79)• Warfarin: 72 (64–80) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Coleman 2016  | US | Cohort study | • Rivaroxaban: 71.3 (11.1) • Dabigatran: 70.9 (10.8) • Warfarin: 71.5 (11.3) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Larsen 2016  | Denmark | Cohort study | Median (interquartile range) age (years)• Apixaban: 71.3 (65.8-77.2)• Dabigatran: 67.6 (62.0-72.4)• Rivaroxaban: 71.8 (65.7-78.9)• Warfarin: 72.4 (64.7-79.8) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Nelson 2016  | US | Cohort study (using Optum's Integrated Claims-Clinical dataset) | 73 | Adjusted on Safety/Baseline characteristics |
| Lamberts 2016  | Denmark | Cohort study | 73 (IQR = [66 ; 81]) | Adjusted on Effectiveness/Safety/NR for Basline |
| Lip 2016 | US | Cohort study | Not reported | Adjusted on Baseline characteristics |
| Deitelzweig 2016  | US | Cohort study | • apixaban 69.7 • warfarin 71.2 | Not reported  |
| Wong 2016 | US | Database analysis | Not reported | Adjusted on Baseline characteristics |
| Norby 2016  | US | Database analysis | Mean: 71 | Adjusted on Effectiveness/Baseline characteristics |
| Kodani 2016  | Japan | Registry | • Overall: 69.7 (9.9)• No-OAC: 68.3±12.0 • Warfarin: 70.1±9.4 • Xaban/DTI: 67.1±8.3 | Adjusted on Effectiveness |
| Chan 2016  | Taiwan | Cohort study | Before Propensity-Score Weighting• Dabigatran: 75 (10)• Warfarin: 71 (12)After Propensity-Score Weighting• Dabigatran: 76 (10)• Warfarin: 75 (10) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Kamble 2015  | US | Cohort study | Range between 65,2±11,4 and 72,5±11,9 | Adjusted on Baseline characteristics |
| Amin 2015 | US | Cohort study | Not reported  | Adjusted on Effectiveness/Baseline characteristics |
| Seeger 2015 | US | Cohort study | Not reported  | Not reported  |
| Lip 2015 | US | Cohort study | Not reported | Adjusted on Baseline characteristics |
| Charlton 2015 | US | Cohort study | • Warfarin: 74• Rivaroxaban: 68• Dabigatran: 69 | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Alpesh 2015 | US | Database analysis | Not reported | Not reported  |
| Nishtala 2016  | New Zealand | Cohort study | After PSM: • Dabigatran: 77.30 (6.4) • Warfarin: 77.40 (6.6) | Adjusted on Baseline characteristics |
| Chan 2015  | China | Cohort study | • Total: 84.8 (4.0)• Dabigatran : 83.6 (3.2)• Warfarin : 85.1 (4.1) | Adjusted on Effectiveness/Baseline characteristics |
| Gorst-Rasmussen 2016 | Denmark | Cohort study | • Rivaroxaban 15 mg: 82.8 (8.7)• Rivaroxaban 20 mg: 72.8 (9.9)• Dabigatran 110 mg: 80.8 (8.0)• Dabigatran 150 mg: 66.0 (8.5)• Warfarin: 72.6 (11.3) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Chan 2016  | China | Cohort study | • Total: 72.7 (12.2)• Dabigatran : 71.9 (11.1)• Warfarin : 72.9 (12.5) | No adjustment |
| Korenstta 2016 | The Netherlands | Cohort study | • Dabigatran: 70.6 (8.9)• Acenocoumarol:72.3 (9.3) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Okumura 2016  | Japan | Cohort study | • Rivaroxaban: 63.0 (10.4)• Warfarin: 67.7 (9.9)　 | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Chan 2016  | Taiwan | Cohort study | Before PSM:• Rivaroxaban: 76 (9)• Dabigatran: 75 (9)• Warfain: 71 (12)After PSM:• Rivaroxaban: 76 (9)• Dabigatran: 75 (9)• Warfain: 76 (8) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Ellis 2016 | Israel | Cohort study | Median (range):• Warfarin: 79 (27–99)• Dabigatran150: 78 (52–89)• Dabigatran110 : 82 (55–95)• Rivaroxaban: 82 (58–91) | Adjusted on Effectiveness/Baseline characteristics |
| Pallisgaad 2016 | Denmark | Cohort study | (median [IQR])• VKA: 62.9 [55.1, 68.8]• Dabigatran: 65.1 [58.0, 70.0] | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Yap 2016 | Malaysia | Cohort study | Mean age (range):• Dabigatran: 65.3 (11.3)• Warfarin: 66.8 (11.3) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Coleman 2016  | US | Claims analysis | After PSM:• Rivaroxaban: 70.66 (10.99)• Warfarin: 70.72 (11.35)• Apixaban: 71.00 (11.25)• Warfarin: 71.15 (11.32) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Marler 2016 | US | Chart review | • Dabigatran + Rivaroxaban + Warfarin 70.1 (12.6)• Warfarin 68.3 (14.6) | No adjustment |
| Yavuz, 2016  | Turkey | Registry | •Dabigatran 110 mg 75.2 ± 8.7•Dabigatran 150 mg 66.2 ± 9.1•Warfarin 68.4 ± 11.9 | Adjusted on Effectiveness/Baseline characteristics |
| Beyer-Westendorf 2016 | Germany | Database analysis | With 180 days follow-up•Dabigatran 73.9 (10.1)•Rivaroxaban 74.8 (10.4)•VKA 74.7 (9.8)With 360 days follow-up•Dabigatran 74.0 (9.8)•Rivaroxaban 74.3 (10.0)•VKA 74.6 (9.7) | No adjustment |
| Naganuma 2016  | Japan | Cohort study | Median [range]• Dabigatran (CrCl (mL/min) ＜50): 80 [66-93]• Dabigatran (CrCl (mL/min) ≥50): 69 [31-91]• Rivaroxaban (CrCl (mL/min) ＜50): 78 [69-89]• Rivaroxaban (CrCl (mL/min) ≥50): 70 [36-84]• Apixaban (CrCl (mL/min) ＜50): 79 [57-91]• Apixaban (CrCl (mL/min) ≥50): 70 [40-90]• Warfarin (CrCl (mL/min) ＜50): 78 [53-94]• Warfarin (CrCl (mL/min) ≥50): 67 [27-90] | Not clear |
| Li 2016 | China | Cohort study | • Warfarin TTR <65%: 73.9 ± 13.2 (SD)• Warfarin TTR ≥65%: 71.1 ± 11.7 (SD)• Rivaroxaban: 73.3 ± 12.1 (SD)• Dabigatran: 71.9 ± 11.1 (SD) | Adjusted on Baseline characteristics |
| Bengtson 2016  | US | Cohort study | New Users:Dabigatran: 68.5 ( 12.3)Warfarin: 70.8 (12.1)Switchers:Dabigatran: 70.9 (11.3)Warfarin: 71.5 (11.4)Pooled:Dabigatran: 70.4 (12.0)Warfarin: 72.5 (12.2) | Adjusted on Effectiveness/Baseline characteristics |
| Halvorsen, 2016 | Norway | Cohort study | • Dabigatran: Mean (SE) 70.8 (11.3)• Rivaroxaban: Mean (SE) 74.7 (10.7)• Apixaban: Mean (SE) 74.5 (11.1)• Warfarin: Mean (SE) 74.6 (11.9) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Johnson 2016  | UK | Cohort study | OAC naïve patients, median (IQR)• Apixaban:75.0 (68.0–83.0)• Rivaroxaban: 77.0 (70.0–83.0)• Dabigatran: 74.0 (66.0–81.0)• VKA: 75.0 (68.0–82.0)OAC experienced patients, median (IQR)• Apixaban: 77.0 (69.0–83.0)• Rivaroxaban: 78.0 (70.0–84.0)• Dabigatran: 76.0 (68.0–82.0)• VKA: 75.0 (68.0–80.0) | Adjusted on Baseline characteristics |
| Staerk, 2016  | Denmark | Cohort study | Median (IQR)• VKA 73 (65–80)• Dabigatran 71 (65–80)• Rivaroxaban 74 (67–83)• Apixaban 76 (68–84) | Adjusted on Effectiveness/Safety/Baseline characteristics |
| Lip 2016  | US | Cohort study | • Apixaban Mean, SD: 69.34, 12.33• Dabigatran 66.83, 12.17• Rivaroxaban 67.33, 12.25• Warfarin 72.53, 11.88 | Adjusted on Baseline characteristics |
| Lip 2016  | US | Cohort study | • Apixaban: 69.1 (12.3)• Dabigatran: 66.9 (12.2)• Rivaroxaban: 69.7 (11.9)• Warfarin:  PSM Warfarin vs Apixaban: 69 (12.3) PSM Warfarin vs Dabigatran: 67.5 (12.3) PSM Warfarin vs Rivaroxaban: 70.1 (12) | Adjusted on Baseline characteristics |

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